

Bull. Natn. Sci. Mus., Ser. A (Zool.), 3 (2), March 22, 1977

*Lophioglyphus japonensis* sp. nov. (Acarina, Glycyphagidae)  
from *Apodemus speciosus* (Rodentia, Muridae)

By

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(Communicated by Yoshinori IMAIZUMI)

FAIN (1965 a) described the hypopus that occurred in hair follicles of the European woodmouse, *Apodemus sylvaticus*, under the name of *Lophuromyopus apodemi*, and he (1968) finally relegated it to the genus *Apodemopus*, which was once regarded as a subgenus of the genus *Lophuromyopus* (FAIN, 1967). LUKOSCHUS *et al.* (1972) established a method to rear the hypopus up to the adult, and presented morphological accounts on the stages other than the hypopus. It was, thus, proved that the hypopus, *Apodemopus apodemi*, gave rise to the adult of *Lophioglyphus liciosus* VOLGIN, 1964, which had been found from nests of rodents in USSR.

In hair follicles of the tail of *Apodemus speciosus* from Kong Yang, China, preserved in alcohol in the collection of the Muséum National d'Histoire Naturelle, Paris, one of the present authors (F. L.) found a hypopus slightly different from that of *L. liciosus*. The suggestion that the Japanese woodmice must be parasitized by closely related species has been checked by another member of the authors (K. U.). Although no follicle hypopus has so far been found on *Apodemus argenteus*, *A. speciosus* is very commonly infested with hypopi of a new species. This mite was successfully reared up to the adult by the methods presented by LUKOSCHUS *et al.* (1971, 1972), FAIN *et al.* (1972) and FAIN and LUKOSCHUS (1975).

A description of the new species with detailed figures and tabulated measurements for comparison of them with those of the European species will be given below together with the rearing data.

#### Rearing Methods and Results

After preliminary rearing experiments, the tritonymphs and adults listed in the following text were brought up from tissue hypopi. The host was *A. speciosus* taken

on August 31, 1974, at Hakuba Village, Nagano Prefecture, Japan. The tail was cut off after the exposure of the mouse to 4°C for 2 days. Hypopi were pressed out off tail follicles with the aid of forceps and a stout needle under the dissecting microscope, and were let stay on the surface of the tail. Very small amount of the ground dry yeast granules was sprinkled over the tail as the food for the mites. The tail was, then, cut into 2 pieces. The pieces carrying hypopi and their food were kept separately in 1×6 cm glass tubes each with thin hygroscopic paper and a loose cotton plug. The rearing tubes were stored in the container under a constant humidity, 75% RH. The temperature for one rearing tube was constantly 10°C, and for the other 10°C for first 3 days and room temperature above 25°C thereafter.

First tritonymph appeared within 3 days and adults emerged 4 days later at 10°C, while all tritonymphs gave rise to adults by 2 to 4 days at the room temperature. Some eggs were found on the surface of the tail kept at the room temperature afterwards.

### *Lophioglyphus japonensis* sp. nov.

(Figs. 1-17)

*Female* (Figs. 1-4, and 16). Idiosoma 370  $\mu$  long by 190  $\mu$  wide in holotype; 451 (370-504)  $\mu$  long by 259 (190-295)  $\mu$  wide in 10 paratypes.

*Venter* (Fig. 1). Cuticle soft, verrucose. Epimera I Y-shaped; coxal field III closed. Vulva situated among coxae III and IV, with two fairly sclerotized longitudinal valves and a soft median valve. Two pairs of small genital suckers, small, strongly sclerotized epigynum (*eg*) and indistinct genital apodemes (*ap*) present. Anal opening (*A*) situated subterminally. Duct to bursa copulatrix (*bc*) opening behind anal slit; lumen of bursa copulatrix indistinct in all preparations. Setation as follows: Three pairs of genital setae, *ga*, *gm* and *gp*, and 5 pairs of anal setae, *a* 1-5.

*Dorsum* (Figs. 2 and 4). Cuticle soft, with multiple verrucae. Setae thick, finely pectinated and on elevations; base of seta with multiple verrucae on mammillate surface (Fig. 4: Scanning photograph of surroundings of scapular external seta). Two pairs each of vertical (*v*) and scapular (*sc*) setae; setae *vi* situated extero-anteriad from *ve*; *sc i* caudad from level of *sc e*; plumose, unbranched suprocoxal setae (*s-cx*) present. Opisthosomal setae consisting of 5 pairs each of dorsal, *d* 1-5, and lateral, *l* 1-5, setae and a single pair of humeral setae (*h*). Setal length as in Table 1.

*Gnathosoma*. Pedipalp projecting by two segments, tibia and tarsus; tibia with 2 setae; tarsus with 1 seta, 2 spines and 1 solenidion. Palpal coxae with 2 pairs of setae, with lateral ones pectinated. Chelicera strong, with dentate chelae (Fig. 3).

*Legs*. All legs with 5 free segments and a long stalked ambulacrum with a single tiny claw. Setae, excluding broad, spiniform antero-ventral one, on each tarsus setiform (Fig. 16); setae on other segments of all legs with very short pectinations. Chaetotaxy: Tarsi, 8-8-8-8; tibiae, 2-2-1-1; genua, 2-2-1-0; femora, 1-1-0-1; trochanters, 1-1-1-0. Solenidiotaxy: Tarsi, 3-1-0-0; tibiae, 1-1-1-1; genua, 1-1-0-0. Famulus epsilon present on tarsus I.

*Lophioglyphus japonensis* from an *Apodemus*

11



Figs. 1-3. *Lophioglyphus japonensis* sp. nov., female (holotype). — 1. Venter. — 2. Dorsum. — 3. Chelicera.

*Male* (Figs. 6-5, and 17). Idiosoma 323  $\mu$  long by 171  $\mu$  wide in allotype; 325 (306-346)  $\mu$  long by 175 (167-186)  $\mu$  wide in 10 paratypes.

Genital opening situated ventrally between coxae IV, with sclerotized genital apodemes. Penis very short; 2 pairs of suckers minute. One pair of anal setae,  $a$  1, lacking; tarsi III and IV each with only 6 setae, instead of 8 of female; all tarsal setae, including antero-ventral ones, setiform (Fig. 17).

Other structures on venter (Fig. 5), dorsum (Fig. 6), gnathosoma and legs, including setation, setal nature and solenidiotaxy, essentially as in female, but almost all setae somewhat shorter than in female (Table 1).

*Tritonymph* (Figs. 7 and 8). Idiosoma 387 (342-409)  $\mu$  long by 225 (190-247)  $\mu$  wide in 10 specimens. Cuticle soft, with low, simple verrucae. No sexual dimorphism observed in this stage.

*Venter* (Fig. 7). Epimera free. Genital opening situated between coxae IV, with 2 pairs each of valves and suckers. Chaetotaxy as in female; setal length as in Table 1.

*Dorsum* (Fig. 8). Chaetotaxy as in female, but all setae being shorter and small-

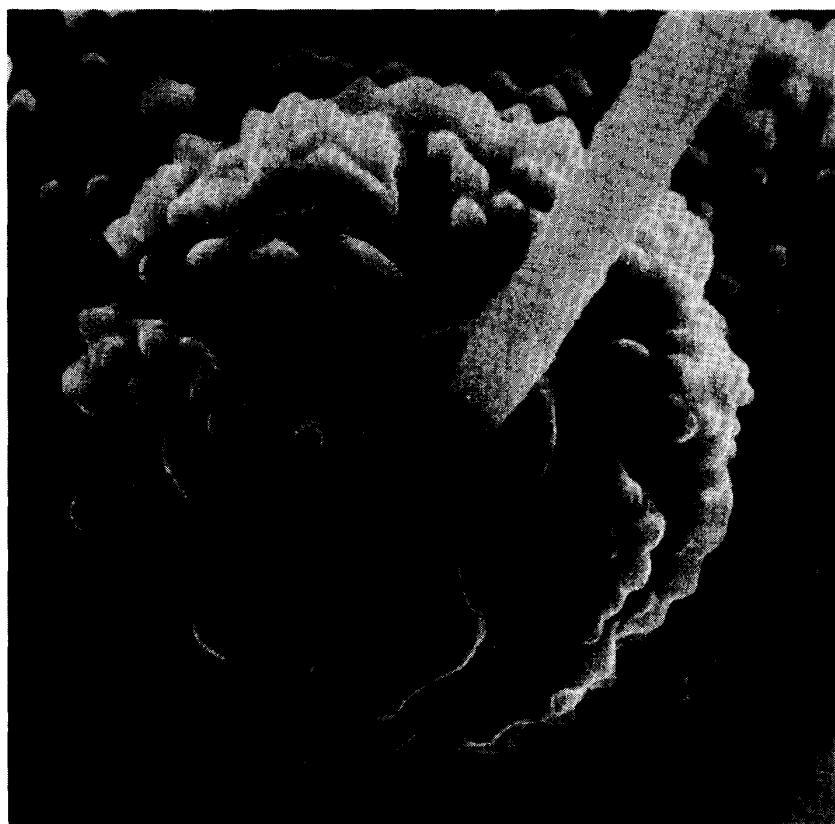


Fig. 4. *Lophioglyphus japonensis* sp. nov. Scanning photograph of idiosomal surface in surroundings of scapular external seta.

er than corresponding ones of female.

Legs. Chaetotaxy: Tarsi, 8-8-6-6; tibiae, 2-2-1-1; genua, 2-2-1-0; femora, 1-1-0-1; trochanters, 1-1-1-0. Solenidiotaxy as in female.

*Tissue hypopus* (Figs. 9-11 and 12-15). Heteromorphic nymph of the type of endofollicular parasites of Rodentia lacking suckers or claw-like clasping organs (FAIN, 1965 b). Cuticle smooth and white; legs brownish. Idiosoma 355 (314-380)  $\mu$  long by 212 (152-238)  $\mu$  wide in 10 specimens.

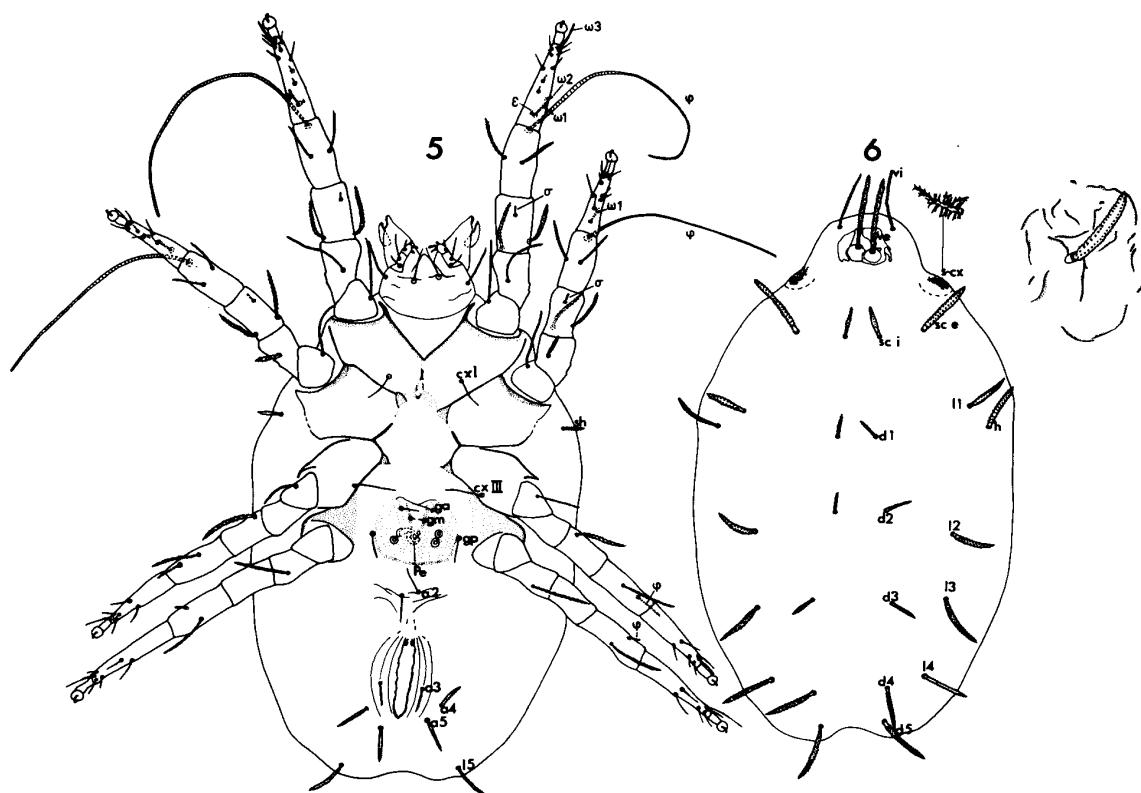
Venter (Fig. 9). Epimera I fused with each other into V-shape; epimera III and IV forming closed coxal fields III. Two pregenital sclerites (*p sc*) widely separated by engorging. Genital opening situated subterminally, with oblong oval valves and 2 pairs of suckers. Anal opening (*A*) situated terminally, with triangular pygidial sclerites ending in strongly sclerotized lateral spines (Fig. 11). Palposoma with 2 of 7  $\mu$  and 12  $\mu$  long setae and a pair of very short solenidia alpha.

Dorsum (Fig. 10). Sejugal furrows present caudad from scapular setae. Dorsal shield very weakly sclerotized and finely punctured, with 3 pairs of pores. Dorsal and pygidial shields not connected. Soft cuticle irregularly wrinkled transversely according to degrees of engorgement.

Legs (Figs. 12-15). Legs I (Fig. 12) and II (Fig. 13) each with an ambulacrum

Table 1. Comparison of measurements in micron (average values) between specimens of *Lophioglyphus japonensis* sp. nov. and *Lophioglyphus liciosus* VOLGIN, 1964.

		Female		Male		Tritonymph		Hypopus	
		<i>L. japonensis</i>	<i>L. liciosus</i>						
Body length	451	383	325	284	387	353	355	322	
	minimum	371	336	306	266	342	271	313	282
	maximum	504	423	346	314	409	448	380	370
Body width	259	240	175	176	225	225	212	183	
	minimum	190	224	167	157	190	176	152	163
	maximum	295	266	186	193	247	277	230	214
Setal length	<i>vi</i>	62	50	35	49	21	41	33	24
	<i>ve</i>	40	94	46	80	16	28	29	19
	<i>sc i</i>	34	106	22	74	18	42	6	9
	<i>sc e</i>	61	81	40	72	22	52	6	9
	<i>d 1</i>	18	117	15	66	14	50	6	8
	<i>d 2</i>	18	117	12	67	11	52	4	6
	<i>d 3</i>	18	113	14	74	11	54	5	6
	<i>d 4</i>	53	120	24	67	19	46	4	6
	<i>d 5</i>	54	65	33	51	18	39	0	0
	<i>l 1</i>	50	74	24	62	18	41	5	7
	<i>l 2</i>	57	93	25	64	20	41	6	6
	<i>l 3</i>	44	83	27	67	21	43	6	6
	<i>l 4</i>	47	65	26	60	15	41	7	5
	<i>l 5</i>	27	43	21	41	15	36	5	6
	<i>s-cx</i>	20	18	15	18	13	13	4	5
	<i>h</i>	55	69	31	59	18	45	5	5
	<i>sh</i>	13	44	12	41	8	23	4	6
	<i>cx I</i>	29	27	20	18	17	15	—	—
	<i>cx III</i>	18	12	17	18	11	8	0	0
	<i>ga</i>	14	6	9	11	9	6	10	6
	<i>gm</i>	12	7	3	10	7	7	—	—
	<i>gp</i>	17	22	13	15	8	6	—	—
	<i>a 1</i>	11	7	—	—	—	—	—	—
	<i>a 2</i>	5	9	11	8	1	5	—	—
	<i>a 3</i>	14	11	15	8	8	6	—	—
	<i>a 4</i>	19	28	15	33	11	13	—	—
	<i>a 5</i>	25	28	20	25	11	18	—	—
Tarsal length	I	49	46	45	49	46	33	30	24
	II	54	44	37	39	45	31	31	24
	III	68	59	37	44	43	33	48	48
	IV	81	78	45	54	46	36	16	13
Solenidia	$\varphi$ (I)	113	106	142	170	72	83	23	33
	$\varphi$ (II)	75	70	123	98	56	54	21	21
	$\varphi$ (III)	13	21	16	21	9	18	4	5
	$\varphi$ (IV)	5	5	4	5	2	3	3	3
	$\omega 1$ (I)	10	10	10	9	7	9	10	6
	$\omega 3$ (I)	17	31	16	20	14	20	11	12



Figs. 5–6. *Lophioglyphus japonensis* sp. nov., male (allotype). — 5. Venter. — 6. Dorsum.

and an 8  $\mu$  long strong claw; legs III (Fig. 14) and IV (Fig. 15) each with one claw reduced to a spine and lacking ambulacrum. Femora I and II each with a broad flattened seta originating from a deep base; tibiae III and IV each bearing a hoe-shaped seta with 3 (sometimes 4) points and a deep base. Chaetotaxy: Tarsi 6–6–8–4; tibiae, 2–2–1–1; genua, 2–2–1–0; femora, 1–1–0–0; trochanters, 1–1–1–0. Solenidiotaxy: Tarsi, 2–1–0–0; tibiae, 2–2–1–1; genua, 1–1–0–0. Famulus epsilon present on tarsus I; omega 3 situated not extremely apically.

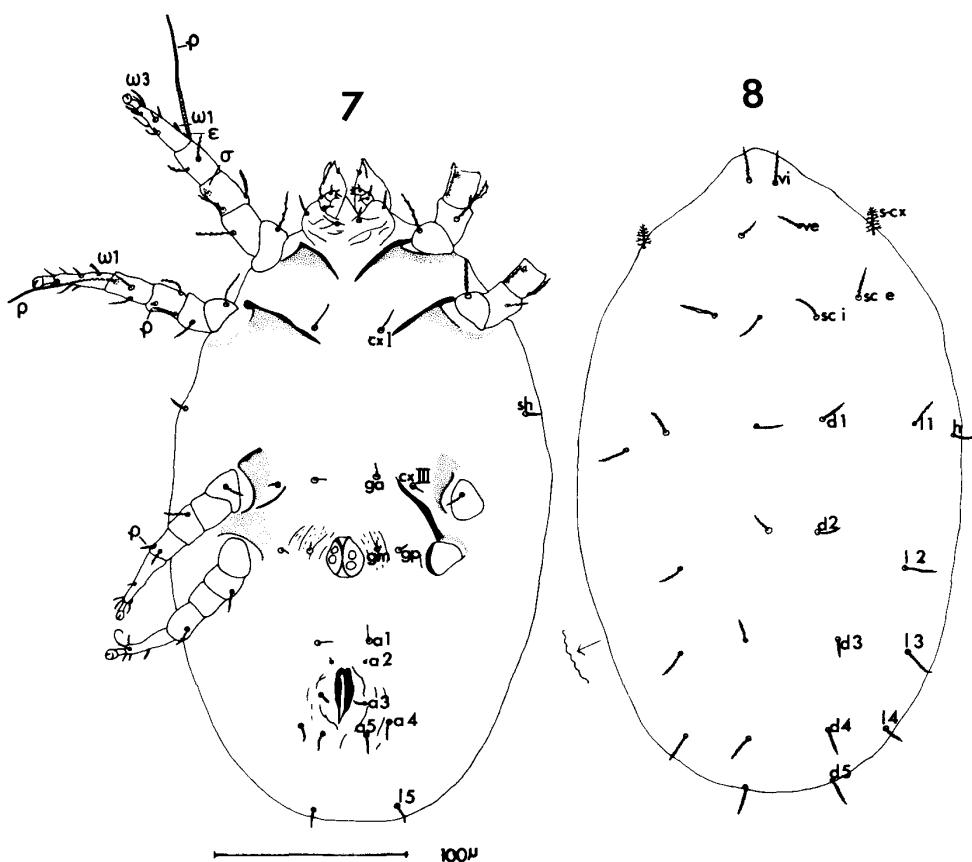
*Host and locality.* *Apodemus speciosus* TEMMINCK, 1845, Hakuba Village, Nagano Prefecture, Japan, August 31, 1974, coll. K. UCHIKAWA. Same host from Kong Yang, China, preserved in alcohol in the Muséum National d'Histoire Naturelle, Paris (many hypopi from hair follicles of the tail).

*Deposition of types.* The holotype female (NSMT-Ac 8992), allotype male (NSMT-Ac 8993), paratype females (NSMT-Ac 8994), paratype tritonymphs (NSMT-Ac 8995) and paratype tissue hypopi (NSMT-Ac 8996) are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo, Japan.

Paratype females, tritonymphs and hypopi: U. S. National Museum, Washington, D. C., USA; Institute of Acarology, Columbus, Ohio, USA; Field Museum of Natural History, Chicago, Illinois, USA; Bernice P. Bishop Museum, Honolulu, Hawaii, USA; Institut de Médecine Tropical Prince Léopold, Antwerpen, Belgium; British Museum

*Lophioglyphus japonensis* from an *Apodemus*

15

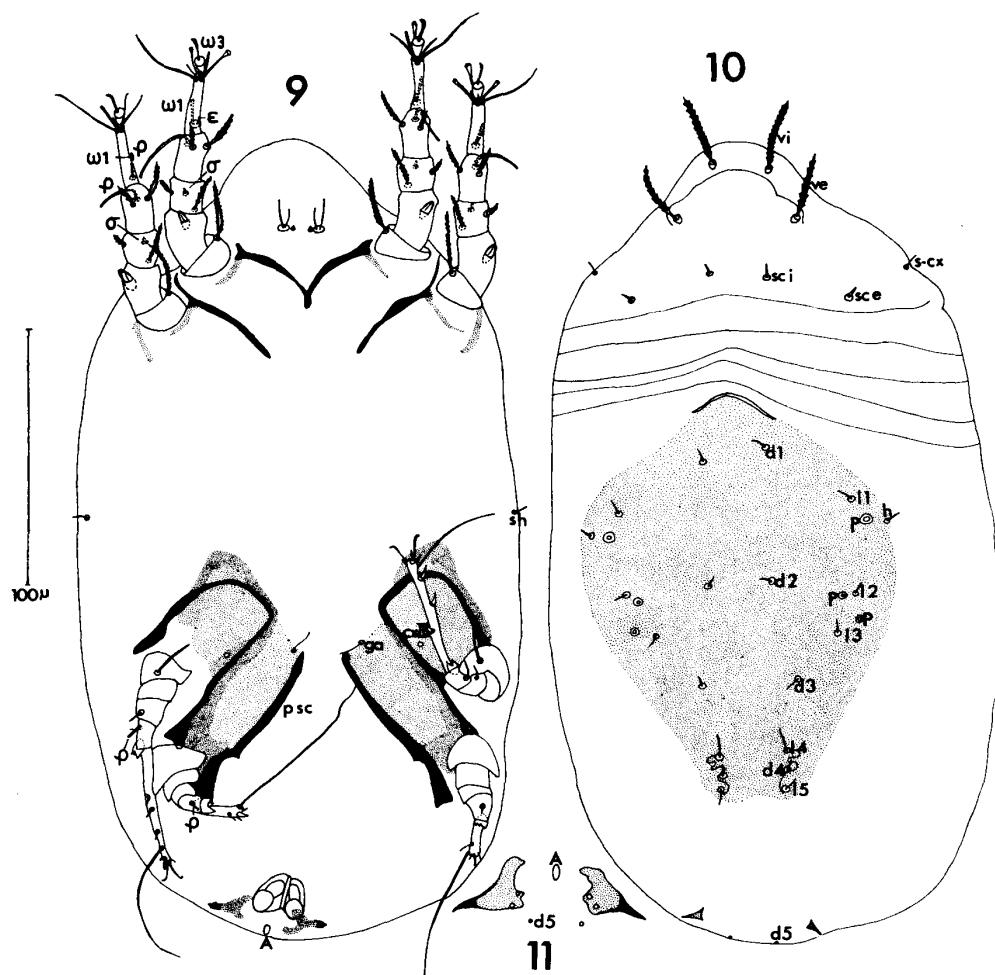
Figs. 7-8. *Lophioglyphus japonensis* sp. nov., tritonymph. — 7. Venter. — 8. Dorsum.

(Natural History), London, England; Muséum National d'Histoire Naturelle, Paris, France; Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands; Zoologisches Institut und Zoologisches Museum, Hamburg, Germany; and in the collections of the authors.

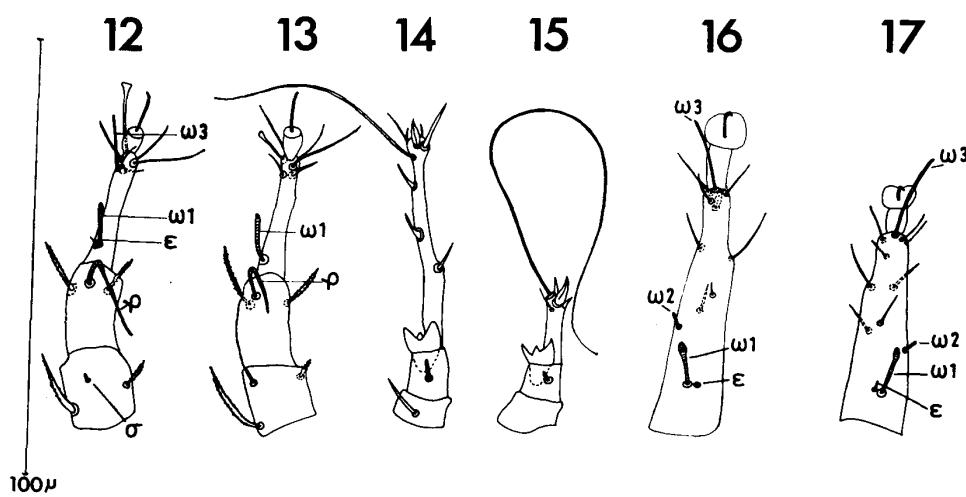
*Remarks.* *Lophioglyphus japonensis* sp. nov. is very closely related to *L. liciosus* VOLGIN, 1964. The hypopus of the former is separable from that of the latter barely by having specific dorsal surface, rather short vertical setae and distinctive solenidion alpha. The differences between the two species are pronounced in the adult and tritonymphal stages. The idiosoma of the new species is slightly larger than that of *L. liciosus*. The setae, *vi*, *l* 1-5 and *d* 1-5, are distinctly shorter in the new species than in *L. liciosus* (Table 1).

Another related species, the hypopus *Apodemopus anathanae* FAIN, 1969, from the Indian tree shrew, *Anathan elliot* (Tupaiidae), differs from the hypopus of the new species in having short, spine-like coxal setae I and strong spine-like scapular setae situated closer to vertical setae.

The parasitic hypopi, *L. japonensis* sp. nov. and *L. liciosus*, show similarities also in the parasite-host-interaction (LUKOSCHUS et al., 1972) and in the results of rearing experiments.



Figs. 9–11. *Lophioglypus japonensis* sp. nov., tissue-hypopus. — 9. Venter. — 10. Dorsum. — 11. Anal opening with triangular pygidial sclerites from a squashed specimen.



Figs. 12-17. *Lophioglyphus japonensis* sp. nov., legs. — 12, 13, 14 and 15. Legs I, II, III and IV of tissue-hypopus. — 16. Tarsus I of female. — 17. Tarsus I of male.

### Abstract

The hypopus, tritonymph and adults of *Lophioglyphus japonensis* sp. nov., a parasite in hair follicles of the tail of the East Asian woodmouse, *Apodemus speciosus*, are described and figured in detail. Rearing data from tissue hypopi up to adults are presented, and measurements of the three stages are compared with those of *L. liciosus* VOLGIN, 1964, from the European woodmouse, *Apodemus sylvaticus*.

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